iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** IV **Month of publication:** April 2026

DOI: https://doi.org/10.22214/ijraset.2026.79295

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IV Apr 2026- Available at www.ijraset.com

Review on Crowdfunding Platform Using Blockchain

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Abstract: ***Crowdfunding has become a popular method for raising funds; however, traditional platforms suffer from limitations such as lack of transparency, risk of fraud, and dependence on intermediaries. This project proposes a decentralized crowdfunding platform that leverages blockchain technology and smart contracts to ensure secure and transparent fund management. The system introduces an admin-based verification mechanism, where users and campaigns are validated using identity documents to enhance trust and authenticity. In addition, the platform supports a hybrid payment model, allowing campaigns to be created in either Ethereum (ETH) or Indian Rupees (INR). ETH-based campaigns operate on the blockchain using MetaMask, while INR-based campaigns support traditional payment methods such as UPI and card transactions. The system also includes features such as campaign categorization, user dashboards, and decentralized storage using IPFS. By combining blockchain technology with conventional payment systems, the proposed platform provides a flexible, secure, and accessible solution for modern crowdfunding applications.***

Keywords: Blockchain, Crowdfunding, Smart Contracts, Ethereum, Decentralization.

I. INTRODUCTION

Crowdfunding is a modern method of raising funds where individuals or organizations collect small contributions from a large number of people, typically through online platforms. It has gained popularity for supporting various initiatives such as education, healthcare, startups, and social causes. Unlike traditional funding methods, crowdfunding provides an easy and accessible way for project creators to reach a wider audience.

However, existing crowdfunding platforms face several challenges. Most systems are centralized, which leads to a lack of transparency, higher transaction fees, and dependency on intermediaries. Contributors often do not have full visibility into how their funds are used, which can reduce trust. Additionally, the absence of proper verification mechanisms increases the risk of fraud and fake campaigns.

Blockchain technology offers a solution to these issues by providing a decentralized and secure system for managing transactions. It ensures transparency through an immutable ledger where all transactions are recorded and cannot be altered. Smart contracts further enhance the system by automating processes such as fund collection and distribution based on predefined conditions, eliminating the need for manual intervention.

The proposed system introduces a decentralized crowdfunding platform that integrates blockchain with modern web technologies. It includes user and campaign verification through an admin-based system, where users must upload identity documents and campaigns are approved before publication. The platform also provides features such as campaign categorization, user dashboards, and profile management. By combining transparency, security, and verification mechanisms, the system aims to create a reliable and efficient crowdfunding solution.

II. MOTIVATION

The motivation for this project arises from the limitations of traditional crowdfunding systems. Many platforms lack transparency, making it difficult for contributors to track how their funds are utilized. Additionally, centralized systems are prone to fraud, where users may create fake campaigns or misuse collected funds.

Another major issue is the absence of proper identity verification. Without verification, it is difficult to establish trust between contributors and campaign creators. Therefore, there is a need for a system that ensures transparency, security, and accountability.

Blockchain technology, combined with smart contracts and verification mechanisms, provides a promising solution to these challenges. The proposed system aims to create a trustworthy and efficient crowdfunding platform.

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III. PROBLEM STATEMENT

Traditional crowdfunding platforms are centralized, resulting in lack of transparency, high transaction fees, and dependence on intermediaries. Contributors have limited control over how their funds are used, and the absence of proper user and campaign verification increases the risk of fraud. Moreover, many blockchain-based solutions are limited to cryptocurrency, making them inaccessible to users unfamiliar with digital assets. Therefore, there is a need for a secure and flexible crowdfunding system that ensures transparency, supports both cryptocurrency and fiat payments, and includes proper verification mechanisms to enhance trust and usability.

IV. LITERATURE SURVEY

Sr. No	Author(s) & Year	Title	Key Findings	Limitations	Relevance to Proposed System
1	Adwaith Viju et al., 2024	Crowdfunding using Blockchain	Uses smart contracts for secure and transparent fund management	Lacks strong user verification	Provides base idea of blockchain transparency
2	Tanmay Zade et al., 2024	Crowdfunding Using Blockchain	Decentralized system with transaction tracking and smart contracts	Scalability and deployment challenges	Supports decentralized crowdfunding model
3	Pooja Wanjale et al., 2023	Blockchain Crowdfunding System	Eliminates intermediaries and improves trust	No authentication or KYC system	Highlights need for decentralization
4	Kaustubh Anavkar et al., 2023	Ethereum-based Crowdfunding	Uses Solidity and Ethereum for automation	Limited backend/frontend integration	Helps in smart contract design
5	Swamiraj Jadhav et al., 2022	Blockchain Based Crowdfunding System	Identifies fraud issues and delays in traditional systems	No hybrid storage approach	Justifies need for blockchain adoption
6	Ritvik Gupta et al., 2022	Crowdfunding using Ethereum Blockchain	Implements smart contract-based contribution system	No user identity verification	Basis for contract logic implementation
7	Belleflamme et al., 2015	Decentralized Crowdfunding using Smart Contracts	Focuses on automation and trust using smart contracts	No integration with real-world payment systems	Highlights need for hybrid payment model
8	A. Sharma et al., 2021	Blockchain-based Crowdfunding System for Secure Transactions	Enhances security and transparency using decentralized ledger	Limited scalability and UI design	Supports secure transaction model

Table 1: Literature Review

From the literature survey, it is observed that while blockchain-based crowdfunding systems improve transparency and security, most existing solutions lack proper user authentication, campaign verification, and scalable architecture. The proposed system addresses these limitations by integrating KYC-based user verification, admin-controlled campaign approval, and hybrid storage using MongoDB and IPFS.

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ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IV Apr 2026- Available at www.ijraset.com

V. METHODOLOGY

The development of the proposed decentralized crowdfunding platform follows a systematic and structured approach, integrating blockchain technology with modern web development frameworks. The methodology is divided into multiple stages to ensure efficient design, implementation, and deployment of the system.

A. Requirement Analysis

In the initial phase, the system requirements were identified, including user authentication, campaign creation, fund contribution, admin verification, and blockchain integration. Special emphasis was placed on security, transparency, and scalability.

B. System Design

A layered architecture was designed consisting of frontend, backend, blockchain, and storage layers. This modular design ensures better scalability, maintainability, and efficient interaction between different components of the system.

C. Smart Contract Development

Smart contracts were developed using Solidity to handle the core functionalities of the system, including campaign creation, contribution handling, approval mechanisms, and fund transfer. These contracts ensure that all transactions follow predefined rules and are executed automatically without human intervention.

D. Frontend Development

The user interface was developed using React and Vite to provide a responsive and user-friendly experience. Integration with MetaMask allows users to securely connect their wallets and perform blockchain transactions. The frontend communicates with smart contracts using ethers.js.

E. Backend Development

The backend was implemented using Express.js to manage application logic and user authentication. JWT was used for secure session handling, while Nodemailer and Twilio were integrated for email and mobile verification respectively. The backend also manages admin functionalities such as user and campaign approval.

F. Storage Integration

A hybrid storage approach was used to improve efficiency. MongoDB was used to store user data, campaign details, and verification records, while IPFS was used to store images and documents in a decentralized manner.

G. Testing and Deployment

Smart contracts were tested locally using Anvil and Forge to ensure correctness and security. After successful testing, the contracts were deployed on the Sepolia test network. The frontend was deployed on Vercel, and the backend was deployed on Render, ensuring accessibility and scalability.

VI. PURPOSED SYSTEM

The proposed system is a decentralized crowdfunding platform designed to overcome the limitations of traditional crowdfunding systems by integrating blockchain technology, smart contracts, and a robust verification mechanism. The system ensures transparency, security, and accountability in fundraising activities.

The platform allows users to register by providing personal details such as name, email, mobile number, and date of birth. To enhance security, users are required to upload government-issued identity documents such as Aadhaar Card, PAN Card, Passport, Driving License, or Voter ID. These documents are reviewed by the admin, who can approve or reject user accounts. This verification process helps prevent fake users and ensures platform authenticity.

Once verified, users can create crowdfunding campaigns by entering details such as title, category, description, funding goal, deadline, and relevant images. The system supports multiple categories including education, healthcare, technology, and arts. Additionally, campaign creators must upload supporting documents, which are verified by the admin before the campaign is published.

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The system introduces a hybrid payment model, allowing campaigns to be created in either Ethereum (ETH) or Indian Rupees (INR). If a user selects ETH, the campaign operates on the blockchain using smart contracts, and contributors can donate through MetaMask wallets. All transactions are recorded on the blockchain, ensuring transparency and immutability. If the user selects INR, the campaign operates off-chain, and contributors can donate using UPI or card-based payment methods. This approach increases accessibility and allows users unfamiliar with cryptocurrency to participate.

A user dashboard is provided to enhance usability and monitoring. Users can view and manage their campaigns through the "My Campaigns" section and filter them based on status such as active, funded, or expired. The profile module displays personal information, wallet address, and activity statistics including total ETH donated, total ETH raised, and number of campaigns created. It also includes a document verification section to show the status of uploaded documents.

The system follows a hybrid storage approach for efficiency and scalability. Financial transactions are stored on the blockchain, while user data and campaign details are stored in MongoDB. Images and documents are stored using IPFS to ensure decentralized and secure storage.

Overall, the proposed system provides a flexible, secure, and transparent crowdfunding solution by combining blockchain technology, traditional payment systems, and strong verification mechanisms.

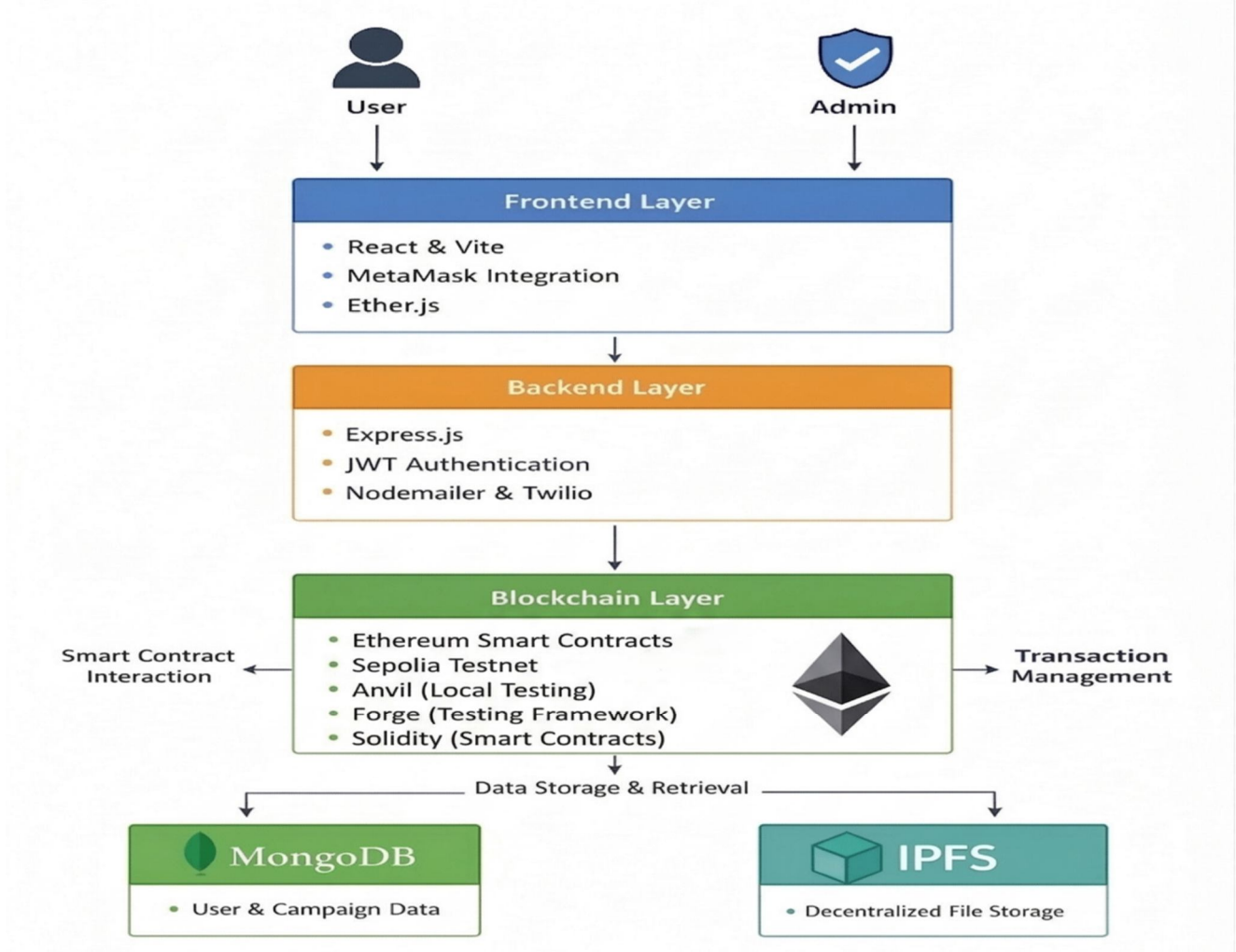


Fig. 1: System Architecture of the Proposed System

VII. FUTURE SCOPE

The proposed system can be further enhanced by incorporating advanced technologies and features to improve scalability, usability, and performance. One potential improvement is the integration of Layer 2 blockchain solutions such as Polygon to reduce transaction costs and increase processing speed. This would make the platform more efficient and accessible to a larger number of users.

Additionally, artificial intelligence techniques can be implemented to detect fraudulent activities and analyze campaign authenticity. A mobile application can also be developed to provide better accessibility and user experience across different devices. The platform can be extended to support multiple cryptocurrencies, allowing users to contribute using different digital assets.

Furthermore, features such as NFT-based rewards for contributors and decentralized governance mechanisms can be introduced to increase user engagement and transparency. These enhancements would make the system more scalable, secure, and suitable for real-world deployment.

VIII. CONCLUSION

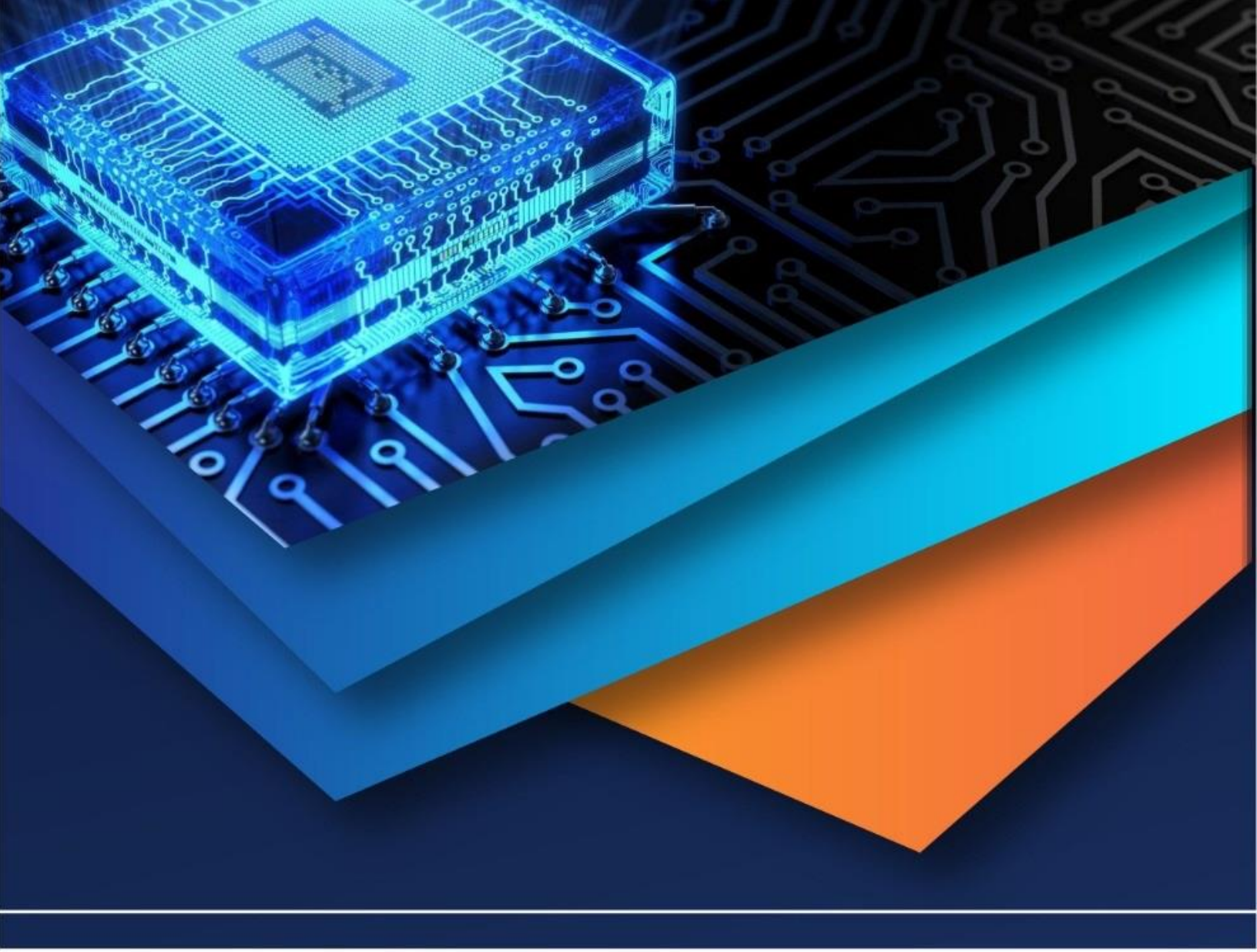
The proposed decentralized crowdfunding platform effectively addresses the limitations of traditional crowdfunding systems by leveraging blockchain technology and smart contracts. The system ensures transparency, security, and trust by recording transactions on an immutable ledger and automating fund management processes.

The integration of admin-based user and campaign verification enhances reliability by preventing fraudulent activities and ensuring authenticity. Additionally, the introduction of a hybrid payment model, supporting both Ethereum (ETH) and Indian Rupees (INR), improves accessibility by allowing users to participate using either blockchain-based or traditional payment methods. Features such as campaign categorization, user dashboards, and profile management further enhance usability and provide a comprehensive user experience. By combining decentralized technology with real-world payment systems and verification mechanisms, the proposed platform offers a scalable, secure, and practical solution for modern crowdfunding applications.

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